

WASTE MANAGEMENT OF ILLINOIS, INC. CID Q/T  
Permit # 1986 EF 1503

1503-86  
**RECEIVED**

SEP 24 1986

Environmental Protection Agency  
WPC—Permit Log In

**LEACHATE & INDUSTRIAL WASTEWATER  
PRE-TREATMENT DESIGN REPORT**

**WASTE MANAGEMENT, INC.  
138th STREET & CALUMET EXPRESSWAY  
CALUMET CITY, ILL.**

**SEPTEMBER 10, 1986**

EPA Region 5 Records Ctr.



304139



**AquaTec, Inc.**

1235 Shappert Drive

Rockford, Illinois 61111

(815) 654-1800

1503-86  
**RECEIVED**

SEP 24 1986

Environmental Protection Agency  
WPC — Permit Log In

DESIGN REPORT  
WASTE MANAGEMENT OF ILLINOIS, INC.  
CID PROCESSING CENTER  
LANDFILL LEACHATE AND INDUSTRIAL WASTEWATER PRETREATMENT FACILITY  
CALUMET CITY, ILLINOIS

WASTE MANAGEMENT OF ILLINOIS, INC. IS THE APPLICANT AND WILL BE THE OWNER AND OPERATOR OF THE PROPOSED FACILITIES.

ALL REFERENCES TO WASTE MANAGEMENT, INC. IN THIS REPORT, AS OPERATOR OF THE PROPOSED PROCESS SHALL BE INTERPRETED TO MEAN WASTE MANAGEMENT OF ILLINOIS, INC.

## EXECUTIVE SUMMARY

Waste Management, Inc. proposes to develop an effective and economical Leachate and industrial waste pretreatment facility at it's CID site at 138th Street and the Calumet Expressway in Calumet City, Illinois. This project is intended to fill an immediate need for pretreatment of on-site generated landfill Leachate. In filling this need, allowances will be made for use of the facilities to treat additional off-site landfill Leachates and industrial wastewaters.

Extensive analytical and pilot studies of Leachates generated at the CID site as well as potential industrial wastewater contributions have been conducted. The studies have evaluated the use of both anaerobic and aerobic wastewater pretreatment technologies.

With regard to the site generated Leachate which is of primary concern to Waste Management, Inc. the Sequencing Batch Reactor aerobic pretreatment process has exhibited the best performance. This process has been shown to be effective in the removal of COD and the reduction of metal and organic priority pollutants to levels well below the Metropolitan Sanitary District of Greater Chicago discharge requirements. Further, volatile organic compounds found to exist in the Leachate have been eliminated through the pilot Sequencing Batch Reactor process. The volatile organic compounds constitute less than 0.5 pounds per day in the influent at average design conditions. Due to the small potential for pollution of the air from this waste, no special equipment permits should be needed to control volatile organic compound emissions.

The industrial wastewater being evaluated for treatment has been found to be amenable to anaerobic reduction. Development of an industrial wastewater anaerobic treatment system is proposed and will be referred to from this point forward as Phase II. The Leachate and industrial waste pretreatment system using the Sequencing Batch Reactor technology is referred to as Phase I.

Simultaneous permitting will be sought for both Phases I and II. Phase I may proceed to construction at an earlier date than Phase II. The Phase I construction will include the provision of sludge collection, thickening, and drying equipment.

Development of the full scale project will include: truck unloading and Leachate and wastewater storage; wastewater transfer pump; storage and blending tanks; Sequencing Batch and anaerobic reactors; including all appertanant machinery, monitoring equipment, and sludge management equipment. Also provided with the construction will be a service building housing a control lab, electrical control room and laboratory

pilot testing facilities. Schedule for development of the project requires start of construction in October of 1986. Initial construction may begin only on Phase I or may include concurrent development of Phases I and II. Phase I will be operational in February of 1987.

Once ready for operation, the Sequencing Batch Reactor treatment process of Phase I will be started using Leachate generated on site. Prior to the introduction of other Leachates or industrial wastewaters into the Sequencing Batch Reactor process, thorough pilot studies will be conducted to substantiate waste compatibility and process effectiveness.

To facilitate this rapid construction and early operating schedule, coordinated review by the Illinois EPA departments has been requested. The plans, together with this design report, are being submitted along with the permit application on September 10, 1986.

## INDEX

- I. Project Description
  - A. Need Phase I
  - B. Need Phase II
  - C. Project Development
  - D. Project Location
- II. Process Selection, Pilot and Analytical Studies
  - A. Advantages of Sequencing Batch Reactor for Treatment of Landfill Leachate
  - B. Site Leachate Pilot treatment studies
    - 1. Description of Pilot Facilities
    - 2. Operating Procedures
    - 3. Summary of Accumulated Data
    - 4. Impact of Pilot Study on Final Design
  - C. Priority Pollutant Scan
    - 1. Procedure
    - 2. Observations
    - 3. Design Recommendations
    - 4. Tabulated Results
- III. Design Parameters
  - A. Phase I
    - 1. Source of Wastewater
    - 2. Wastewater Characteristics
    - 3. Effluent Characteristics
    - 4. Sludge Characteristics for Disposal
  - B. Phase II
    - 1. Source of Wastewaters
    - 2. Wastewater Characteristics
    - 3. Effluent Characteristics
    - 4. Sludge Characteristics

IV. Unit Process Design Criteria - Phase I

- A. Truck Unloading and Wastewater Storage Facilities
- B. Wastewater Transfer Pumping

- 1. Process Design Criteria
- 2. Sequencing Batch Reactor Design Criteria
  - a. Tank
  - b. Aeration
  - c. Mixer
  - d. Decanter
- 3. Aeration Blowers
- 4. Sludge Withdrawal Pumps
- 5. Process Control System

- D. Waste Sludge Accumulation, Volume Reduction, and Disposal System

- 1. Unloading Tank and Storage Tank Desludging Pumps
- 2. Mechanical Gravity Thickener
- 3. Thickened Sludge Draw-off Pumps
- 4. Thickened Sludge Day Tank
- 5. Thickened Sludge Press Feed Pumps
- 6. Recessed Chamber Filter Press
- 7. Cake Solids Storage Hopper
- 8. Sludge Dryer
  - a. Dryer Design Criteria
  - b. Dust Removal-Wet Scrubber Criteria
- 9. Recycle Accumulation Tank
- 10. Building Drain Sump Pumping System

- E. Miscellaneous Systems

- 1. Chemical Feed System
  - a. Nutrient
  - b. Caustic
  - c. Polymer
- 2. Control and Pilot Test Laboratory
  - a. Upper Level
  - b. Lower Level

V. Unit Process Design Criteria - Anaerobic Systems  
Phase II

- A. Truck Unloading Facilities
- B. Wastewater Transfer Pumping
- C. Anaerobic Reactor System
  - 1. Gas-Tight Reaction Tank
  - 2. Solids Separation
  - 3. Boiler/Heat Exchanger
  - 4. Solids Removal Pumping System
  - 5. Methane Gas Collection System

VI. Attachments

- A. Process and Piping Plans
- B. Standard State Forms
  - 1. WPC-PS-1 - Application for Permit or Construction Approval
  - 2. Schedule N - Waste Characteristics
  - 3. Schedule J - Industrial Treatment Works Construction or Pretreatment Works
  - 4. Schedule G - Sludge Disposal and Utilization
  - 5. Land Department Standard Form
- C. Supporting Data
  - 1. Site Location Map (aerial photo)
  - 2. Site Generated Leachate-Historical Characteristics
  - 3. Supporting Literature
    - a. "Biological Treatability of specific organic compounds....." Stover/Kincannon
    - b. "Secondary utilization of trace halogenated organic compounds" Edward J. Bouwer
    - c. "Rapid Aerobic Biostabilization of high strength industrial landfill....." Venkataramani/Ahlert
    - d. "Technology Assessment of Sequencing Batch Reactors" Robert L. Irvine
    - e. "Biological Treatment of a landfill Leachate in Sequencing Batch Reactors" Ying/Bonk/Lloyd/Sojka
  - 4. Geotechnical Report - Testing Service Corporation